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1892

Park and Tree Commission.

Report of

Geo. B. Fudworth,

Bulletin No. 1.

MORNING NEWS PRINT,
Savannah, Ga.

Bulletin 1. April, 1897.

PARK AND TREE COMMISSION,

SAVANNAH. GA.

REPORT

ON

An Examination of the Street and Park Trees of Savannah, Georgia, and Surrounding Country,

TOGETHER

With Recommendations and Instructions for Planting and Increasing the City Flora.

By GEO. B. SUDWORTH,

Dendrologist of the Division of Forestry, U. S. Department of Agriculture.

PUBLISHED BY THE
PARK AND TREE COMMISSION,
SAVANNAH, GA.,
1897.

PARK AND TREE COMMISSION

OF

SAVANNAH, GA.

GEO. H. STONE, Chairman,
GEO. J. BALDWIN, Vice-Chairman,
W. W. GORDON, JR., Secretary,
P. D. DAFFIN,
C. S. ELLIS.

U. S. DEPARTMENT OF AGRICULTURE,
DIVISION OF FORESTRY,
WASHINGTON, D. C., March 29, 1897.

Park and Tree Commission, Savannah, Ga.:

GENTLEMEN—I transmit herewith for your use a report made by the Dendrologist of this Division, Mr. Geo. B. Sudworth, as a result of an examination of your parks and the possibilities of their improvement. The fact that by such an examination not only your own city, but others similarly situated would benefit, made it appear proper that at least the time of a Government officer might be given for such a purpose, you having borne the expenses of his trip.

Hoping that adequate advantages will be derived from the contemplated publication of this report by you, I am,

Respectfully,

B. E. FERNOW,
Chief.

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General Aspect of the Existing Tree Flora.

The general impression received in a survey of the streets is a lack of uniformity, and of the parks one of monotony, both in the form of the trees and in the abundance of two very similar predominating species: Live Oak and Laurel Oak—"Water Oak." The sameness in form, objectionable in the parks, is caused chiefly by the close planting of pole-stock or forest-grown saplings; the trunks being long at first continue to carry the crowns high into the air. The almost total absence of green sward gives an additional bareness, with little to arrest the eye but limbless tree trunks. One is also struck with an apparent disproportion in the large-sized trees growing in narrow, lane-like streets, as also by the large size and excessive number found in the small squares and parts of even larger ones. The effect is one of heterogeneous crowding, with the production of dense shade, which is destructive to under-grown shrubs or other plants.

Tree Flora of Parks and Streets.

STREET TREES.—The following species occur in greater or less numbers, the order of the first three indicating their predominance:

Live Oak,
Quercus Virginiana.
Laurel Oak,
Quercus Laurifolia.
Water Oak,
*Quercus Nigra.**
White Oak,
Quercus Alba.
Sycamore,
Platanus Occidentalis.
China Tree,
Melia Azedarach.
Magnolia,
Magnolia Fœtida.†
Sweet Magnolia,
Magnolia Glauca.
Sweet Gum,
Liquidambar Styraciflua.
Cedar Elm,
Ulmus Crassifolia.
Winged Elm,
Ulmus Alata.
American Elm,
Ulmus Americana.
Redbud,
Cercis Canadensis.
Flowering Dogwood,
Cornus Florida.
Red Bay,
Persea Pubescens.
Paper Mulberry,
Broussonetia Papyrifera.
Red Ash,
Fraxinus Pennsylvanica.
Sugarberry,
Celtis Mississippiensis.
Paulownia,
Paulownia Imperialis.
Red Maple,
Acer Rubrum.
Kentucky Coffeetree,
Gymocladus Dioicus.
Sultan's Parasol,
Sterculia Platanifolia.
Palmetto,
Sabal Palmetto.
Tallowtree,
Stillingia Sebifera (from China; naturalized).

PARK TREES.—The following species are found in greater or less numbers in the city parks and squares:

Live Oak,
Quercus Virginiana.
Laurel Oak,
Quercus Laurifolia.
Water Oak,
Quercus Nigra.
White Oak,
Quercus Alba.

* Q. Aquatica of later date. † M. grandiflora of authors.

Cork Oak,
Quercus Suberosa.
Spanish Oak,
Quercus Digitata.
Hop Hornbeam,
Ostrya Virginiana.
American Elm,
Ulmus Americana.
Winged Elm,
Ulmus Alata.
Cedar Elm,
Ulmus Crassifolia.
Sugarberry,
Celtis Mississippiensis.
Osage Orange,
Toxylon Pomiferum.
Red Mulberry,
Morus Rubra.
Paper Mulberry,
Broussonetia Papyrifera.
Magnolia,
Magnolia Fœtida.
Laurel Magnolia,
Magnolia Fœtida Angustifolia.
Sweet Magnolia,
Magnolia Glauca.
Loblolly Bay,
Gordonia Lasianthus.
Swamp Bay,
Persea Pubescens.
Holly,
Ilex Opaca.
Cassena (Holly),
Ilex Vomitoria.
Sassafras,
Sassafras Sassafras.
Red Maple,
Acer Rubrum.

Laurel Cherry,
Prunus Caroliniana.
Peach,
Prunus Persica.
Black Cherry,
Prunus Serotina.
Flowering Almond,
Prunus Triloba.
Flowering Dogwood,
Cornus Florida.
Redbud,
Cercis Canadensis.
American Beech,
Fagus Latifolia.
Pecan (Hickory),
Hicoria Pecan.
Pignut (Hickory),
Hicoria Glabra.
Red Ash,
Fraxinus Pennsylvanica.
Sycamore,
Platanus Occidentalis.
Water Locust,
Gleditsia Aquatica.
Black Locust,
Robinia Pseudacacia.
Summer Haw,
Crataegus Æstivalis.
Tulip-tree,
Liriodendron Tulipifera.
Paulownia,
Paulownia Imperialis.
Ailanthus,
Ailanthus Glandulosa.
Chinatree,
Melia Azedarach.
Sweet Gum,
Liquidambar Styraciflua.

Boxelder,
Acer Negundo.
Black Birch,
Betula Nigra.
Cottonwood,
Populus Deltoides.
Silver Poplar,
Populus Alba.
Lombardy Poplar,
Populus Nigra Italica.
Devilwood,
Osmanthus Americanus.
Crape Myrtle,
Lagerstræmia Indica.
Maidenhair-tree,
Ginkgo Biloba.
Palmetto,
Sabal Palmetto.
Japanese Cedar,
Cryptomeria Japonica.
Red Juniper,
Juniperus Virginiana.
Chinese Arborvitæ,
Biota Orientalis.
Squarrose Cypress,
Retinospora Squarrosa.
Plume Cypress,
Retinospora Plumosa.
Threadbranch Cypress,
Retinospora Filifera.
Chinese Juniper,
Juniperus Chinensis.
Incense Cedar,
Libocedros Decurrens.
Oliveleaf Podocarpus,
Podocarpus Oleifolia.
Fortune Yew,
Cephalotaxus Fortunii.
Deodar Cedar,
Cedrus Deodara.
Upright Cypress,
Cupressus Sempervirens.
Loblolly Pine,
Pinus Taeda.
Loquat-tree,
Photinia Japonica.
White Cedar,
Chamaecyparis Thyoides.

Additional Species and Varieties Common to Surrounding Country.

The following species, not included in the preceding lists, are more or less common within a radius of twenty miles of Savannah:

Pitch Pine,
Pinus Rigida.
Longleaf Pine,
Pinus Palustris.
Spruce Pine,
Pinus Glabra.
Pond Pine,
Pinus Serotina.
Bald Cypress,
Taxodium Distichum.
Shrub Live Oak,
Quercus Virginiana Maritima.
Turkey Oak,
Quercus Catesbaei.
Durand Oak,
Quercus Breviloba.

Southern Red Oak,
Quercus Texana.
Cow Oak,
Quercus Michauxii.
Narrowleaf Crab,
Pyrus Angustifolia.
Sweet Crab,
Pyrus Coronaria.
Parsley Haw,
Crataegus Apiifolia.
Myrtle Dahoon Holly,
Ilex Cassine Myrtifolia.
Tree Huckleberry,
Vaccinium Arboreum.
Black Gum,
Nyssa Sylvatica.
Water Gum,
Nyssa Biflora.
Tupelo Gum,
Nyssa Aquatica. *
Sour Tupelo,
Nyssa Ogeche.
Deciduous Holly,
Ilex Decidua.
Chickasaw Plum,
Prunus Angustifolia.
Water Ash,
Fraxinus Caroliniana.
Angelica-tree,
Aralia Spinosa.
Hercules' Club,
Xanthoxylum Clava-Herculis.
Chittimwood,
Bumelia Lanuginosa.

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* N. uniflora of authors.

General Principles and Features to be Developed in Street and Park Planting.

STREET PLANTING AND OBJECT.—The principal object in street planting in a warm latitude should be the production of a proper shade for the protection of the pedestrian and inhabitants of a given street or avenue. Landscape effects cannot be secured in the rigid lines of a street, nor is the attempt at variety in appearance on the same street by the use of different species of trees desirable under such conditions—a uniformity in appearance and form of the trees being more in keeping with the precise conditions.

Of the well-adapted kinds for streets of varying widths, only one species or variety should be used on the same street. Several or many kinds may, however, be used on different streets throughout the city and thus give variety in general.

Obviously there is a fitness in the possible size development of certain trees proportionate to the width of the street to receive them. Naturally wide-spreading and high-growing kinds are not desirable for narrow streets for the reason that, with narrow limits, in time they become unsightly in form, completely or quite filling the street with a tangled growth, obstructing the desirable open view, and each tree's crown exhibiting no individuality. Slow-growing, narrow and dense-crowned kinds are, therefore, best suited to narrow limits.

The great necessity of producing shade effects as soon as possible, and of filling in gaps in lines of fore-grown trees often renders the task of selection most difficult, and still more difficult is the task of supplementing the heterogeneous street tree planting of old cities. The opposing public sentiment in most communities usually prevents, or makes undesirable, the immediate removal of all unsuitable trees. Moreover, the advantage

of provisionally utilizing the existing shade of even undesirable kinds makes a slower procedure advisable, producing the final perfect system by degrees. For the sake of present needs a sprawling or overgrown tree may be tolerated for a time, till its usefulness can be supplied by a better kind. In all stages, street, and park planting as well, is a progressive problem. In entirely unplanted streets, where shade is much needed, it is often advisable for immediate benefit to use a mixture of rapid-growing, short-lived trees, together with the slower-growing, permanent species, so arranging and spacing the trees that the finally superfluous kind can be cut out, leaving the permanent kind sufficiently developed and at the proper distance apart. The supervisor of plantings must pursue such a plan as to supply the city with a useful shade as quickly as possible, and observe also such calculations on the future size development of the permanent trees, that they may by reducing their number or confining their crown area, continue to be proper shade producers as well as proportionate to their situation. Not all the trees planted can be allowed to stand for all time. Many individuals, even of the permanent kinds, cease to be useful at certain times and must be promptly removed, or they will damage trees intended to serve in a longer future. They must be wisely sacrificed at the proper time. Fifty quick-growing and one hundred slow-growing trees may together shade a street for ten years, when the slow trees may do the work alone; but in twenty years one-third of these may need to be removed to give proportionate space, but still preserving the required shade.

PARK PLANTING AND OBJECTS.—In all cities, the planting of greater or less park areas should embody three principal objects: aesthetic effect, educational value and shade production.

AESTHETIC EFFECT.—The general appearance of the park or square should be pleasing to the eye in all its approaches; its make-up so arranged as to give a changing variety in the different outlooks. It is, therefore, a place to be

relieved as much as possible from monotony and rigid lines. According to its size and configuration, fitting and varying degrees of landscape effect are to be attempted. In all cases the plant material used must be proportionate in size and form development to the space occupied. As in the case of street planting, the same developmental process must be employed, producing the desired beautifying effects as rapidly as possible, and replacing, removing or modifying certain component plant material in order to maintain continuously the desired effect.

EDUCATIONAL VALUE.—The educational influence promoted by an extensive inclusion of different species cannot be overestimated in its value to the transient and permanent public. A large number of species is thus made familiar to willing and interested observers with the least expenditure of time on their part. The growing importance of giving more attention in schools and colleges to the study of shrubs and forest trees—at present much neglected—cannot be more effectually encouraged by city authorities than by placing the study material within easy reach. It is a kind of natural, educational book-making which cannot fail to commend itself to all intelligent and public spirited citizens. Moreover, since nearly all species may lend some desirable and ornamental feature to the park, the increase of kinds will in no sense interfere with the artificial effects.

PARK SHADE.—Parks and squares should be retreats supplying in parts cool shade as well as pleasing sights for the eye. Unlike the street trees, not all the park trees are to play the role of shade producers; some will be for shade, while others will serve only as elements in a total or partial beautifying effect. In most positions the park trees will develop under freer and more natural conditions than those in the streets. As in the case of the street trees, there must be a fitness in the size and form development of the shade producers to the precise conditions and limits of space in which they are to be used. Those trees to serve for permanent shade

should be of kinds likely to maintain desirable shade, proportionate size and beauty of form for the longest time. Obviously such species as may with age and rapidity of growth produce great height and breadth of crown should not be attempted as permanent trees in a small square, but preferably in positions where size is a permissable or necessary concomitant. Slow growing and small or medium-sized species are best suited for the permanent shade of small areas.

Special Fitness of Trees for Certain Purposes.

The climate and soil conditions of every locality will more or less limit the range of species to be used in city planting. In addition, the liabilities to injure through various natural or artificial agencies must have some bearing on the selection of species for given purposes. Of equal importance, also, is the ability of certain species to quickly and effectually repair wounds from pruning.

Of necessity almost all street trees should endure well the free use of the knife and saw, for according to the needs of the position they must be cut back to proper limits, or from accidental injuries may need to be otherwise severely pruned. Those species of trees suited to a given climate, combining great strength of wood—and therefore resistance to violent storms—and ability to repair damages, together with the other desirable qualities, should be used in all exposed streets and avenues. The more frangible, but not less useful, trees may, for the sake of greater variety, be safely planted in sheltered streets, or in those less liable to be swept by high winds.

Likewise trees for outside or exposed sites in parks and squares should combine as much as practicable the qualities of resisting breakage and of repairing injuries.

It is, however, practically impossible to select species that will be unaffected by the violence of storms. Some species possess resistance to a greater or less degree, and advantage can be taken of such good qualities; but injuries, and even total destruction of the strongest ornamental trees can be looked for. Wise precautions such as judicious cutting back

and "heading in," or taking advantage of wind-breaks, will always serve to lessen injuries and reduce losses. Permanence and stability in trees in any position is only relative, and can never be absolute. Those to whom the care of a city's trees is entrusted must be constantly watchful, in one part of the city now applying the knife and saw when future safety demands smaller crowns, or in another part removing damaged or unsightly trees and filling their places with new stock from the nursery. A city's trees, like all other plants which are to give useful material or serve important purposes, cannot be left entirely to themselves after they are planted. Their needs must be studied daily, for the maintenance of well kept, ornamental trees in a city is secured only by unceasing vigilance and care.

Practical Consideration of Street and Park Planting.

SPECIAL FEATURES.—Every city may delight in some feature peculiarly striking or distinctively characteristic. Southern cities can from their favorable climatic conditions emphasize certain features of the native subtropical flora. Savannah may produce an unique impression in its streets and parks by supplementing its already large number of Live Oak and introducing in the parks and in certain streets conspicuous lines of the native Palmetto. Both are popularly and widely known, and the visitor can never forget the peculiar impression left by each collectively and individually. Regardless of its other tree flora, it can be distinctively the city for its sombre Live Oaks and stately Palmettos.

Trees for Principal and Broad Streets.

The following species may be used in the wider and principal streets. The preference is denoted by the order of occurrence in the list:

Live Oak,
Quercus Virginiana.

Palmetto,
Sabal Palmetto.

Sweet Gum,
Liquidambar Styraciflua.

Cow Oak,
Quercus Michauxii.

Red Oak,
Quercus Rubra.
American Sycamore,
Platanus Occidentalis.
European Sycamore,
Platanus Orientalis.
White Oak,
Quercus Alba.
American Elm,
Almus Americana.
Winged Elm,
Ulmus Alata.
Basswood,
Tilia Americana.
Red Maple,
Acer Rubrum.
Honey Locust,
Gleditsia Triacanthus.

Trees for Narrow Streets.

Magnolia,
Magnolia Fœtida.
Laurel-leaf Magnolia,
Magnolia Fœ. Angustifolia.
Sweet Bay,
Magnolia Glauca.
Turkey Oak,
Quercus Catesbaei.
Winged Elm,
Ulmus Alata.
Red Maple,
Acer Rubrum.
Norway Maple,
Acer Platanoides.
Boxelder,
Acer Negundo.
Bolle Poplar,
Populus Alba Bolleana
(columnar form),
Elm-leaf Linden,
Tilia Ulmifolia.
Sugar-berry,
Celtis Mississippiensis.
Laurel Cherry,
Prunus Caroliniana.
Redbud,
Cercis Occidentalis.
Ohio Buckeye,
Aesculus Glabra.
Bitternut Hickory,
Hicoria Minima.
Tallow-tree,
Stillingia Sebifera.
Maidenhair-tree,
Ginkgo Biloba
(columnar form).
Loblolly Bay,
Persea Pubescens.
Persimmon,
Diospyros Virginiana.
China-tree,*
Melia Azedarach.
Paper Mulberry,
Broussonetia Papyrifera.

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* Useful for quick shade, not as a permanent tree. It should be kept headed in and low to prevent severe damages by wind.

Undesirable Street Trees.

A few species existing in greater or less numbers in the streets of Savannah are clearly shown by long trial to be undesirable, either from their liability to severe damage by storm, and inability to repair damage, or from an ill-adapted form development. The most numerous is the Laurel Oak (*Quercus Laurifolia*). In exposed sites it has been much more severely broken by wind than the Live Oak, so that there are many one-sided or limbless stubs marring the streets in various parts of the city. It repairs wounds from pruning imperfectly and slowly, and not being sufficiently different in general aspect of its foliage from the more sturdy and long-suffering Live Oak, there is nothing to commend it as a future permanent street tree. The ill-shaped wrecks now standing should be speedily removed, as the empty space is far more desirable than their unsightly and slovenly looking remains.

The following are recommended for removal as soon as practicable and to be replaced by more suitable kinds. They are better represented in the park flora, but those of the rarer kinds should not be removed till representatives are established in the parks:

Laurel Oak,
Quercus Laurifolia.

Water Oak,
Quercus Nigra.

Dogwood,
Cornus Florida.

Paulownia,
Paulownia Imperialis.

Kentucky Coffee-tree,
Gymnocladus Dioicus.

Red Ash,
Fraxinus Pennsylvanica.

Sultan's Parasol,
Sterculia Platanifolia.

Park Planting.

Every park or small square should have emphasizing features made prominent by contrast in the size of its trees and other plants. Grounds planted entirely with uniformly large, middle or small-sized trees present a monotonous appearance and serve only for shade. The large trees should supply the necessary and principal shade and at the same time give gross ex-

pression to the arborescent elements. The small and middle-sized trees may, in a less degree, serve the same purposes, and for the more confined areas form the principal elements. Low-growing or shrub-like trees are useful and necessary for producing mass-effects at certain points, or in angles at the opening of walks, for the sake of variety in form, or, in still other places, dense planting is necessary to form vistal outlooks, all of which give pleasing variety as the observer proceeds. With proper disposition the parks and squares should together contain representatives of all the species that can be accommodated, without violating the general principles aimed at in city planting. All the kinds used in the streets should be found, as well at least in one or more individuals, in the parks and squares; for it is here that the greatest freedom can be given for the more perfect development of species in the open.

The following lists of native and foreign trees may be used for the purposes noted. Species not otherwise designated have deciduous foliage and spreading crowns:

Large Trees for Shade in Parks.

Magnolia,
Magnolia Fœtida (evergreen).
Cucumber-tree,
Magnolia Acuminata.
Tulip-tree,
Liriodendron Tulipifera.
Basswood,
Tilia Americana.
Downy Basswood,
Tilia Pubescens.
White Basswood,
Tilia Heterophylla.
Silver Linden,
Tilia Argentea (Europe).
European Linden,
Tilia Platyphyllos (Europe).
Common Linden,
Tilia Vulgaris (Europe).
Palmetto,
Sabal Palmetto (evergreen).
Black Walnut,
Juglans Nigra.
English Walnut,
Juglans Regia (Europe and Asia).
Pecan,
Hicoria Pecan.
Bitternut,
Hicoria Minima.
Shagbark Hickory,
Hicoria Ovata.
Shellbark Hickory,
Hicoria Laciniosa.

Mockernut Hickory,
Hicoria Alba.
Pignut Hickory,
Hicoria Glabra.
White Willow,
Salix Alba (Europe. Few).
Cottonwood,
Populus Deltoides (few).
White Poplar,
Populus Alba (Europe).
Bolle Poplar,
Populus Alba Bolleana
(columnar form).
American Beech,
Fagus Latifolia.
European Beech,
Fagus Sylvatica (Europe).
American Chestnut,
Castanea Dentata.
European Chestnut,
Castanea Castanea (Europe).
White Oak,
Quercus Alba.
Post Oak,
Quercus Minor.
Bur Oak,
Quercus Macrocarpa.
Overcup Oak,
Quercas Lyrata.
Chestnut Oak,
Quercus Prinus.
Chinquapin Oak,
Quercus Acuminata.
Swamp White Oak,
Quercus Platanoides.
Cow Oak,
Quercus Michauxii.
Live Oak,
Quercus Virginiana (evergr'n).
Red Oak,
Quercus Rubra.
Texan Oak,
Quercus Texana.
Scarlet Oak,
Quercus Coccinea.
Yellow Oak,
Quercus Velutina.
Spanish Oak,
Quercus Digitata.
Pin Oak,
Quercus Palustris.
Water Oak,
Quercus Nigra (semi-everg'n).
Laurel Oak,
Quercus Laurifolia (evergr'n).
Willow Oak,
Quercus Phellos.
Bitter Oak,
Quercus Cerris (Europe).
European Oak,
Quercus Dentata ("*daimio*"),
Japan.
Slippery Elm,
Ulmus Pubescens.
White Elm,
Ulmus Americana.
Wing Elm,
Ulmus Alata.
European Elm,
Ulmus Campestris (Europe).
Dutch Elm,
Ulmus Montana (Europe).
Sweet Gum,
Liquidambar Styraciflua.

Sycamore,
Platanus Occidentalis.
European Sycamore,
Platanus Orientalis (Europe).
Kentucky Coffee-tree,
Gymnocladus Dioicus.
Ailanthus,
Ailanthus Glandulosa (China).
Sugar Maple,
Acer Saccharum.
Black Maple,
Acer Saccharum Nigrum.
Silver Maple,
Acer Saccharinum.
Cut-leaf Silver Maple,
Acer Saccharinum Wierii.
Red Maple,
Acer Rubrum.
Yellow Buckeye,
Aesculus Octandra.
Purple Buckeye,
Aesculus Octandra Hybrida.
Black Gum,
Nyssa Sylvatica.
Tupelo Gum,
Nyssa Aquatica (try from seed or small seedlings).
Sour Tupelo,
Nyssa Ogeche (try from seed or small seedlings).
Common Catalpa,
Catalpa Catalpa.
Hardy Catalpa,
Catalpa Speciosa.

Conifers.

Bhotan Pine,
Pinus Excelsa.
Bull Pine,
Pinus Ponderosa.
Loblolly,
Pinus Taeda.
Pitch Pine,
Pinus Rigida.
Short-leaf Pine,
Pinus Echinata.
Long-leaf Pine,
Pinus Palustris.
Cuban Pine,
Pinus Heterophylla.
Carolina Hemlock,
Tsuga Carolinianx.
Hemlock,
Tsuga Canadensis.
Japanese Hemlock,
Tsuga Sieboldii (Japan).
Norway Spruce,
Picea Excelsa (Europe).
White Spruce,
Picea Canadensis.
Oriental Spruce,
Picea Orientalis (Asia Minor).
Nordmann's Fir,
Abies Nordmanniana (Asia Min.)
Apollo Fir,
Abies Apollinis (Asia Minor).
Cephalonian Fir,
Abies Cephalonica (Asia Minor).
European Silver Fir,
Abies Pectinata (Europe).
Siberian Fir,
Abies Pichta (Siberia).

White Fir,
Abies Concolor.
Bald Cypress,
Taxodium Distichum.
Chinese Cypress,
Glyptostrobus Sinensis (deciduous. Supposed to be China and Japan).
Big-tree,
Sequoia Washingtonia.
Redwood,
Sequoia Sempervirens.
Incense Cedar,
Libocedrus Decurrens.
Japan Cedar,
Cryptomeria Japonica (Japan).
Maidenhair-tree,
Gingko Biloba (deciduous), (China and Japan).

Medium and Small Trees for Shade in Small Squares and in Confined Limits of Larger Areas.

Sweet Magnolia,
Magnolia Glauca (semi-everg'n)
Yellow-flower Cucumber-tree,
Magnolia Acuminata Cordata.
Large-leaf Umbrella,
Magnolia Macrophylla.
Umbrella-tree,
Magnolia Tripetala.
Fraser Umbrella,
Magnolia Fraseri.
Lily Magnolia,
Magnolia Conspicua (China and Japan).
Spice Magnolia,
Magnolia Hypoleuca (Japan).
Soulange Magnolia,
Magnolia Soulangeana (Known only in cult.)
Papaw,
Asimina Triloba.
Loblolly Bay,
Gordonia Lasianthus (everg'n).
Franklinia,
Gordonia Altamaha.
Elm-leaf Linden,
Tilia Ulmifolia.
Prickly Ash,
Xanthoxylum Clava-Herculis.
Hop-tree,
Ptelea Trifoliata.
Holly,
Ilex Opaca (evergreen).
Dahoon Holly,
Ilex Cassine (evergreen).
Myrtle-leaf Holly,
Ilex Cassine Myrtifolia (everg.).
Yaupon Holly,
Ilex Vomitoria (evergreen).
Deciduous Holly,
Ilex Decidua.
Nutmeg Hickory,
Hicoria Myristicaeformis.
Water Hickory,
Hicoria Aquatica.
Babylon Willow,
Salix Babylonica (Europe).
Large-toothed Aspen,
Populus Grandidentata.

River Birch,
Betula Nigra (open grown).
European Alder,
Alnus Glutinosa (Europe).
Cut-leaf Eu. Alder,
Alnus Glutinosa Laciniata
(known only in cultivation).
Hop Hornbeam,
Ostrya Virginiana (high grown).
European Blue Beech,
Carpinus Betulus (Europe).
Blue Beech,
Carpinus Caroliniana.
European Beech,
Fagus Sylvatica (Europe).
Cutleaf Eu. Beech,
Fagus Sylvatica Heterophylla.
Purple-leaf Eu. Beech,
Fagus Sylvatica Purpurea.
Durand Oak,
Quercus Breviloba.
Black Jack Oak,
Quercus Marilandica.
Blue Jack Oak,
Quercus Brevifolia.
Shingle Oak,
Quercus Imbricaria.
Bartram Oak,
Quercus Heterophylla.
English Oak,
Quercus Pedunculata (Europe).
Georgia Oak,
Quercus Georgiana.
Turkey Oak,
Quercus Catesbaei.
Cork Oak,
Quercus Suberosa.
Planer-tree,
Planera Aquatica.

Japanese Elm,
Zelkowa Acuminata (Japan).
Hackberry,
Celtis Occidentalis.
Sugarberry,
Celtis Mississippiensis.
Red Mulberry,
Morus Rubra.
White Mulberry,
Morus Alba (Europe).
Osage Orange,
Toxylon Pomiferum.
Swamp Bay,
Persea Pubescens (evergreen).
Red Bay,
Persea Borbonica (evergreen).
Sassafras,
Sassafras Sassafras.
Sweet Crab,
Pyrus Coronaria.
Narrow-leaf Crab,
Pyrus Angustifolia.
Service-tree,
Amelanchier Canadensis.
Cockspur Haw,
Crataegus Crus-galli.
Scarlet Haw,
Crataegus Coccinea.
Downy Haw,
Crataegus Mollis.
Black Haw,
Crataegus Tomentosa.
Washington Haw,
Crataegus Cordata.
Tree Haw,
Crataegus Viridis.
Parsley Haw,
Crataegus Apiifolia.

Yellow Haw,
Crataegus Flava.
European Hawthorn,
Crataegus Pyracantha.
Wild Plum,
Prunus Americana.
Chickasaw Plum,
Prunus Angustifolia.
Peach,
Prunus Persica (white, pink, red, double-fl. vars. Asia).
Black Cherry,
Prunus Serotina.
Laurel Cherry,
Prunus Caroliniana (everg'n).
Bird Cherry,
Prunus Padus.
Huisache,
Acacia Farnesiana.
Silk-tree,
Albizzia Julibrissin (Japan).
Yellow-wood,
Cladrastis Lutea.
Redbud,
Cercis Canadensis.
Honey Locust,
Gleditsia Triacanthos.
Thornless H. Locust,
Gleditsia Triacanthos Laevis.
Horse Bean,
Parkinsonia Eculeata.
Japanese Sophora,
Sophora Japonica (Japan).
Locust,
Robinia Pseudacacia.
China-tree,
Melia Azedarach (India).
Umbrella China-tree,
Melia Azedarach Umbraculifera.
Waahoo,
Euonymus Atropurpureus.
Boxelder,
Acer Negundo.
European Maple,
Acer Campestre (Europe).
Sycamore Maple,
Acer Pseudoplatanus (green and variegated forms).
Norway Maple,
Acer Platanoides (Europe).
Ohio Buckeye,
Aesculus Glabra.
Texas Buckeye,
Ungnadia Speciosa (evergreen).
Wild China,
Sapindus Marginatus.
Koelreuteria,
Koelreuteria Paniculata (China)
Indian Cherry,
Rhamnus Caroliniana.
Flowering Dogwood,
Cornus Florida.
Red-bract Dogwood,
Cornus Florida Rubra.
Blue Dogwood,
Cornus Alternifolia.
Sourwood,
Oxydendrum Arboreum.
Persimmon,
Diospyros Virginiana.
Silverbell-tree,
Mohrodendron Carolinum.
Snowdrop-tree,
Mohrodendron Dipterum.

Fever tree,
Pinchneya Pabens.

Teas Hybrid Catalpa,
Catalpa Kaempferi (known only in cult.)

Stagbush,
Viburnum Prunifolium.

Rusty Stagbush,
Viburnum Ferrugineum.

Conifers.

Cembran Pine,
Pinus Cembra (Europe).

Scrub Pine,
Pinus Virginiana.

Sand Pine,
Pinus Clausa.

Pond Pine,
Pinus Serotina.

Spruce Pine,
Pinus Glabra.

European Larch,
Larix Larix (Europe).

Golden Pine,
Pseudolarix Kaempferi (China).

African Cedar,
Cedrus Deodara (Himalayas).

Lebanon Cedar,
Cedrus Libani (Asia Minor).

Cunninghamia,
Cunninghamia Sinensis (China).

Blue Spruce,
Picea Pungens Glauceescens.

Himalayan Spruce,
Picea Smithiana.

Tiger-tail Spruce,
Picea Polita (Japan).

Alcock Spruce,
Picea Alcoquiana (Japan).

Fraser Fir,
Abies Fraseri.

Pinsapo Fir,
Abies Pinsapo (Spain).

American Arborvitae,
Thuya Occidentalis.

Chinese Arborvitae,
Biota Orientalis.

Retinospora,
Retinospora Obtusa.

Lawson's Cypress,
Chamaecyparis Lawsoniana.

Upright Cypress,
Cupressus Sempervirens.

White Cedar,
Chamaecyparis Thyoides.

English Yew,
Taxus Baccata.

Red Juniper,
Juniperus Virginiana.

Pyramidal Red Juniper,
Juniperus Virg. Pyramidiformis.

Prickley Cedar,
Juniperus Oxycedrus (China and Japan).

Chinese Juniper,
Juniperus Chinensis (China).

Irish Juniper,
Juniperus Communis Hibernica.

Low and Shrub-like Trees for Mass Effects.

Spanish Bayonet,
Yucca Aldifolia (Evergreen).

Spanish Dagger,
Yucca Gloriosa (S. C. Coast, Evergreen).

Wax Myrtle,
Myrica Cerifera (Evergreen).
Black Alder,
Alnus Serrulata.
Hop Hornbeam,
Ostrya Virginiana.
European Blue Beech,
Carpinus Betulus (Europe).
Chinquapin,
Castanea Pumila.
Narrow-leaf Live Oak,
Quercus Virginiana Maritima.
Shrub Live Oak,
Quercus Virginiana Minima.
Bear Oak,
Quercus Pumila.
Camperdown Elm,
Ulmus Montana Scabra (Weeping Umbrella Shape. Cult.).
Figtree,
Fiscus Carica (Asia).
Loquat-tree,
Photinia Japonica (Evergreen. China and Japan).
Witch Hazel,
Hamamelis Virginiana.
European Service-tree,
Amelanchier Vulgaris (Europe).
Chinese Redbud,
Cercis Chinensis (China).
Frigolito,
Sophora Secundiflora.
Golden Chair,
Laburnum Vulgare (Europe).
Rose Locust,
Robinia Hispida.
American Smoke-tree,
Cotinus Cotinoides.
European Smoke-tree,
Cotinus Cotinus (Europe).
Dwarf Sumach,
Rhus Copallina.
Cutleaf Smooth Sumach,
Rhus Glabra Laciniata.
Burning Bush,
Euonymus Japonica (Evergreen. Europe).
Florida Maple,
Acer Saccharum Floridanum.
Japanese Dwarf Maple,
Acer Palmatum (Green and Red-Leaved Forms. Japan).
Cutleaf Dwarf Maple,
Acer Palmatum Dissectum (Cult.).
Japan Maple,
Acer Palmatum Japonicum (Japan).
Tartarian Maple,
Acer Tataricum (Asia).
Weeping Dogwood,
Cornus Florida Pendula.
European Cornel,
Cornus Mas.
Variegated Eu. Cornel,
Cornus Mas Variegata,
Purple Magnolia,
Magnolia Purpurea (China and Japan).
Star Magnolia,
Magnolia Stellata (Japan).
Angelica-tree,
Aralia Spinosa,
Tree Huckleberry,
Vaccinum Arborem,
Rhododendron,
Rhododendron Maximum (Evergreen).
Bumelia,
Bumelia Lycioides,
Tough Buckthorn,
Bumelia Tenax,

Sweetleaf,
Symplocos Tinctoria (Semi-Evergreen).
Fringe-tree,
Chionanthus Virginica,
Devilwood,
Osmanthus Americanus (Evergreen).
Dwarf Catalpa,
Catalpa Bungii (Cult.).
Mugho Pine,
Pinus Mugho (Europe).
Chinese Golden Arborvitae,
Biota Orientalis Aurea (China and Japan).
Irish Yew,
Taxus Baccata Fastigiata (Europe).
Shortleaf Japan Yew,
Taxus Adpressa (Japan).
Fortune Yew,
Cephalotaxus Fortunii (China).
Torrey-tree,
Tumion Taxifolia.

Local Supply of Forest-grown Plant Material. Nursery-grown Stock; Nursery Work.

LOCAL SUPPLY.—An inspection of the list of species growing wild in the vicinity of Savannah shows a large supply of available plant material. Experience proves that several of these common and useful trees with a fore-growth of 10 to 15 years can be transplanted successfully, among which the Live Oak is pre-eminent for street planting, soon recovering from the necessary heading-in and producing a good crown in a few years.

Theoretically any tree from 10 to 20 or more years of age can be transplanted. Some bear the customary abuse and exposure of being dug up and replanted very successfully, while under the same treatment other kinds fail to recuperate. Broadleaved trees usually bear such treatment well—some requiring greater or less care; but advanced coniferous trees, if at all successful, must be moved with the utmost care not to expose or injure the root system severely. Practically such trees should not be moved when older than 8 to 10 years; and then most successfully when the stock is nursery grown, when the root system has become thickened and accustomed to the shock from an early age by frequent transplantings.

In general forest-grown trees of advanced age which have stood in dense shade, or have been much crowded, have small root systems, and for the less recuperative kinds—beech, birch

oaks and maples—are, therefore, less apt to endure transplanting well than trees of a corresponding age taken from an open field, border of the forest or from an open growth, where the root system is much more robust. Moreover, such trees have developed necessarily under light conditions more nearly like those of their future permanent sites, and are thus better fitted and should be preferably chosen. For street stock, where the trunk should be clean and carry its crown above the heads of pedestrians, trees may be selected from the closer or shaded growth which will give as nearly as possible the needed features. But for certain dense effects in parks, the trees grown up in the full enjoyment of light will afford more attractive crown forms with their branches low to the ground.

The present and future needs of material for various services must be carefully studied in advance, and with such definite purposes in view the collecting of wild stock is more intelligently prosecuted. And as much time may be saved in the growth of trees to a suitable size, as much natural material should be secured as possible.

The Nursery and Its Importance.

The nursery is an indispensible adjunct for a well equipped street and park commission, both as a receptacle till needed, for fore-grown natural stock, for the advancing of very young stock and for the rearing from seed of kinds not otherwise available—except at considerable cost from professional nurserymen. Much stock, however, must necessarily be purchased from dealers, but the majority can be produced.

Most highland forest species will succeed with the proper care when transferred to the city, but a considerable number require experimentation and training in the nursery to determine their fitness for the city, before they are actually introduced. It is less expensive to perform such experiments in the nursery than in the permanent sites.

Thus one of the pines most desirable as an ornamental tree is the Longleaf Pine, so abundant in the vicinity of Savannah. A few carefully conducted experiments in the nursery will de-

termine whether these natural grown young trees from one to ten feet high can be transplanted and at what age best. Otherwise the slow process of raising stock from seed must be resorted to.

Several trees possess a remarkable adaptability to a great variety and widely dissimilar soil and moisture conditions. The Bald Cypress (Taxodium Distichum), the American Larch (Larix Laricina), the Green Ash and Sweet Gum grow alike in inundated swamps and on dry uplands. Experiments on these and other similarly constituted kinds will determine at what age, if at all, natural grown plants can be used. Likewise, it is important to test the native Pond and Spruce Pine (Pinus Serotina and P. Glabra), which, if taken at an early age, may be adapted to drier soil conditions.

The nursery in its constitution and care is a well-kept garden. It is essential that the soil be a loose, deep, permeable one perfectly drained. Other things being equal, the nearer the character of the nursery soil and moisture conditions are like those of the city in which the reared or trained plants are to be used, the more successful will be the transplanting. If not naturally fertile the soil may be properly enriched. If the site chosen is on new or hitherto uncultivated land, the soil should be deeply plowed when first "broken" up, and subsequently kept in a state of thorough cultivation.

Handling and Transplanting Nursery and Other Stock and Pruning.

PROTECTION IN TRANSIT.—Careful and proper handling of uprooted stock has much to do with the vitality of trees when planted. A few kinds, such as Willows, Poplars, Mulberries, etc., endure a great deal of abuse without appearing to lessen their chances of living; but the majority of other trees require the greatest care, in fact, all plants are better for having received it.

In general the roots of a tree to be transplanted should remain out of ground no longer than is absolutely necessary to perform the work of transplanting. For this reason the pits

or holes to receive the trees are best made ready before the trees are brought to the ground. In transporting the trees, no matter how short the distance, the roots should be thoroughly covered with oil cloth, canvas, or any other impervious material which will protect the exposed roots from the drying effects of the sun and air. Especially is this imperative in handling Conifers, a short exposure often sufficing to kill them. A necessary equipment for transporting trees from the nursery to the planting ground is a large, wide, deep, tight wagon box, which can be filled and the top covered with a pliable cover. A large number may then be carried at a time and the supply remain protected while the transplanting is going on.

CARE IN TAKING UP TREES.—Rough and hasty exhuming of trees in the forest or nursery results in serious injuries. Wherever taken up the roots of trees should be raised with as little violence as possible. Liberal digging—even at the expense of more time—is necessary to properly unearth them, especially in the forest. Opposing large roots are to be carefully cut with a sharp tool and so as not to split them—a common occurrence. In no case should trees be wrenched or pulled up by the roots; careless methods which too often crack or shear the fibers of the trunk and roots, injuring the trees beyond recovery.

ROOT AND CROWN PRUNING.—In general, the root system and crown should be proportionate in size—of about the same breadth; the roots sufficient to support or supply nourishment for the crown. This relationship will always determine the extent of root to be taken up, the crown, of course, to be properly reduced afterward. If, after the tree is lifted, the root ends are found to be split or haggled, clean, smooth cuts are to be made all round; otherwise the roughly cut or split root ends decay, and moreover do not as readily throw out rootlets. According to the future service of the tree, for street or park, the crown must also be given its proper form when the necessary pruning is done to make it proportionate to the root system.

HOLES FOR TREES.—The holes for permanently planted trees should not receive the roots at a greater depth than they originally grew. The bottom of the hole is best made with a crowning center, so that the water which usually accumulates will drain off toward the ends of the roots, where it is most needed. In heavy soils where tree holes, even after the trees are set, are apt to be reservoirs for surface water and the roots thus injured by too much soaking, it is advisable to bore one or two small post auger holes at low points in the pit through the impervious substratum, so as to give perfect drainage. A soil too long saturated may kill some trees quite as effectually as one too dry. The best growth is promoted by a moist, but not soaked soil.

SETTING TREES.—A tree is properly set or "planted" when the earth is thoroughly firmed about all the roots; not rammed so as to be impervious to water. The earth filled in should, therefore, be free from lumps or stones.

It is a painstaking operation too often slighted, but one in which thoroughness is very essential for successful growth. As the earth about newly planted trees settles in time, the hole may be filled several inches above the surface of the ground, allowing for the settling.

SHIFTING AND TRANSPLANTING IN THE NURSERY.—The foregoing observations apply as well to the handling of stock in the nursery, where, according to the special needs of certain aged trees, more room is required for development. The work of transplanting, however, can be greatly reduced when a large number of trees are to be shifted, by trenching, instead of digging individual holes, that is, digging long trenches of the proper width and depth, instead of separate holes. The trees are then set continuously and the earth filled in along the line.

GENERAL PRUNING.—Much may be written on the subject of trimming or pruning street and park trees. It is difficult, however, to lay down special rules or give instructions

which can be applied to the necessities of individual trees, whose needs may be very varied and multiform. A few general principles may be discussed, and with these in hand the layman must endeavor to apply them to the existing problems, relying upon cultivated and gained experience. It is to be borne in mind that the good effects of a rational system of trimming can be realized only by a careful study and immediate attention to the special needs of every tree in the city. Spasmodic attempts to correct, by wholesale pruning, any irregularities of several year's growth cannot be productive of the greatest good; since such innovations, made at more or less remote periods, must leave the effects which necessarily require considerable time for growth to overcome. A watchful, critical eye will detect the needed trimming here and there, as the necessities arise and remedy the effects before they become extreme. It is only under such a system of gradual correction that trees may be kept in an uniformly attractive condition.

All trees are most pleasing in the form of their crown when the latter is symmetrical, whether in the street or park, and of whatever type the crown may be, drooping, pyramidal, dome-like or columnar. In many cases it will, of course, be possible to attain only approximate perfection in symmetry of crown development, as some trees are more or less irregular in their growth and difficult to train.

The marked and frequent effect of the more rapid and intruding growth of many broad-leaved trees upon each other and especially upon neighboring conifers must be carefully watched and remedied before the injury is too great. This aggressive evil is very marked in old parks where little or no systematic pruning is done. The spreading and encroaching branches of almost any broad-leaved tree will soon cause a spruce or pine to lose all its branches on the side of contact. The conifers are forever ruined, as unlike their damaging neighbor, they will not respond to trimming with new branches.

Under such circumstances the remedy should always be one which will preserve the greatest number of trees in the best

possible form. If timely shortening of branches on the recuperative kinds will not suffice, the comparative value of the trees involved must be considered and the less valuable cut out to save the more valuable.

Broad-leaved trees in close proximity to each other may also, and often do require the same treatment. Coniferous trees which naturally have an undivided central stem may be freely pruned, but with the understanding that in well advanced or old trees new branches practically never sprout in the place of those cut off. Side branches often bend into a vertical line of growth to take the place of a "leader" broken or pruned very near its end; but almost never if the leader is lost at a point two or more inches in diameter. Side branches cut from the trunk are never replaced. The pruning must, therefore, be confined to the cutting back of branches at the ends, unless to relieve a one-sided crown, an entire branch can be spared. The attempt to save the half or two-thirds of a storm-topped pine or other well advanced conifer is useless; it will always be an unsightly stub and should be taken out.

The pruning of broad-leaved trees, which usually have a more or less divided stem, can be carried on with greater liberty. Severe topping and side pruning is responded to in many kinds by a profusion of new branches, and especially in all younger trees.

HOW TO PRUNE.—The common fault in careless pruning is not to cut limbs close enough to the trunk or main branch. A stump from one to six or more inches left protruding, never to "heal over," in time communicates decay to the main trunk. The result is a weak trunk which the wind may break at will.

The face of the cut should always be flush, or (in exceedingly large limbs) nearly so, with the contour of the trunk or main stem from which the branch is taken. But to be properly executed it is necessary to cut the limb off two or even three times, especially to avoid the splitting down which always occurs in heavy limbs, unless completely supported by a pulley.

All wounds should be immediately and thoroughly coated with a lead paint to prevent decay. A few years will then suffice to "heal over" a smooth, close cut.

Tools.

The expense of pruning a city's trees is frequently increased by workmen being obliged to use poor, improper or too few tools. The park commission should have at their command fitting tools to perform the necessary work of pruning, cutting or taking out trees and other plants with the least expenditure of time and labor, thus hastening the work and reducing the expense.

The commonest inadequacy is seen in the saws used by park laborers—usually some form of a carpenter's fine-toothed, cross-cut saw intended only to cut seasoned timber. Hours are thus spent amputating a limb, which, with a suitable saw could be cut off in a few moments.

The following are some of the principal necessities, to be duplicated according to the amount of work to be done and the number of parties performing it.

Cutting Implements—Saws.

Two-hand cross-cut for cutting up large trunks. One-hand cross-cut, log saws of varying lengths and widths to be worked under various circumstances in pruning.

Pruning Hooks.

An assortment with poles of different lengths and jaws of varying strength to be used for cutting back small branches from the end.

Axes.

An assortment of long and short-handled chopping axes for use when cutting cannot be done with saws.

Digging Implements.

An assortment of long and short-handled spades, shovels

post-hole diggers and augers, pick-axes, grubhoes and crowbars.

Ladders and Lifting Appliances.

An assortment of different lengths of hand-ladders, including extension ladders for reaching tall trees, and step-ladders for operating on tall shrubs or small trees.

An assortment of pulleys, double and single, for letting down trees, large limbs, etc., to avoid damage to neighboring growths.

Labelling Trees.

As a part of the educational value of the park tree flora, some form of permanent label should be chosen on which the common and scientific name of every tree is printed. The best form adopted is a porcelain tablet, * mounted on an iron standard. The name is "fired" in, and, therefore, not affected by the weather; the label may be broken only by a stone thrown or by a malicious blow. The iron standard or rod has a plate-like foot (similar to metal hitchingposts) so that when set in the ground (near the tree) it is not easily pulled up.

Another label of similar form is made entirely of metal the names being hand-painted in black on a white background, or vice versa; a black background is also used with gold letters. But these labels are more or less affected by the action of the weather, and must, therefore, be renewed from time to time.

Public Spirit in the Protection of Street and Park Trees.

It is not too much to say that the American public is no respector of private or public plants. Often only the policeman, the watch-dog or the impenetrable iron fence restrain the ever-present spirit of vandalism. A rose or any other attractive flower blooming in an unprotected private ground or unwatched public place is a menace to the snatching tendencies of many

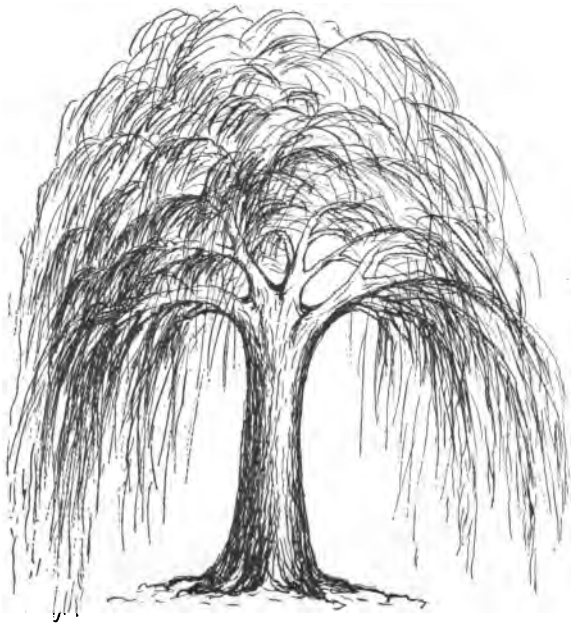
*Apply to Peter Henderson, 35 Courtlandt street, and J. M. Thorburn, 15 John street, New York City, dealers in tree labels.

otherwise well-ordered citizens. Apparently the citizen has a peculiar, or rather no pride at all, in the preservation of the plants that adorn the city at private or public expense.

When adults stultify all moral obligations in this direction, it is not strange that the children who roam our streets and parks should not hesitate to pull flowers and break branches, or swing pleasantly to the destruction of some of the smaller trees, and commit many other damages; it cannot be otherwise than that the reverse of the adage, "The boy is the father of the man," is the true explanation of so common and lamentable a disregard. Children taught to respect as inviolable public and private plants and property will, as men and women exert the same influence by their example. The moral principle violated in the theft of a valueless flower is no less evident than in the case of money stolen or property destroyed. Moreovor, it is a concomitant of true civilization, and should be a matter of public pride for the citizens of every community to unite in a spirit of protecting and maintaining from destruction the city's plants!

Symmetrical.
High grown.

Symmetrical.
Low grown,

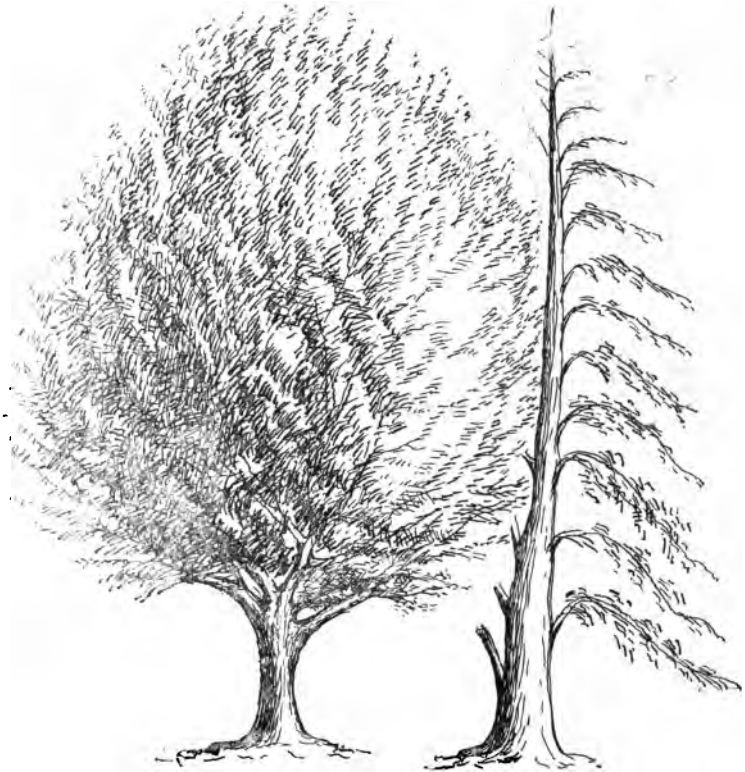


Symmetrical

Neglected.
May recover with attention.

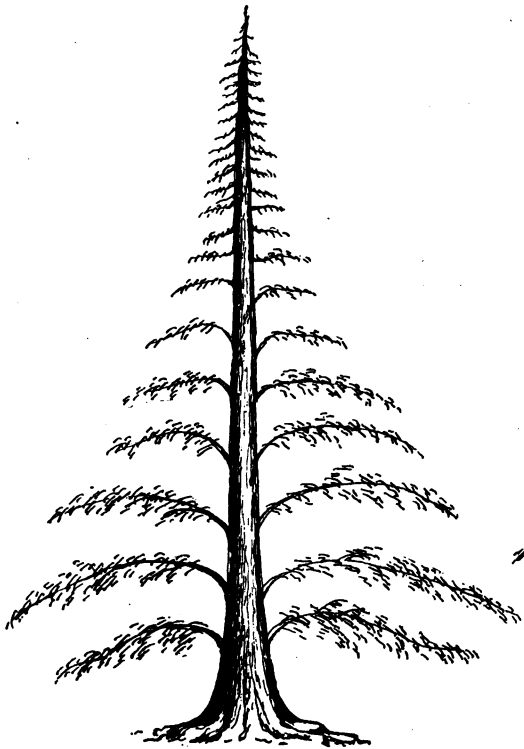
Symmetrical.

Unsymmetrical.
Needed earlier pruning.

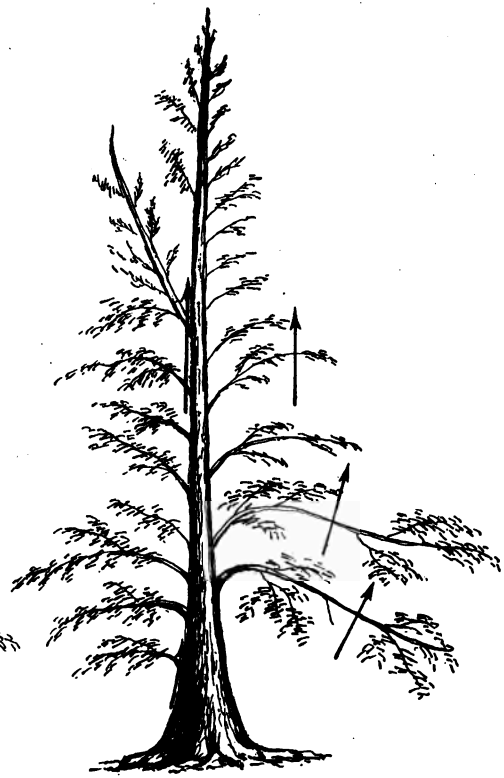


Broad-leaved **Conifer.**

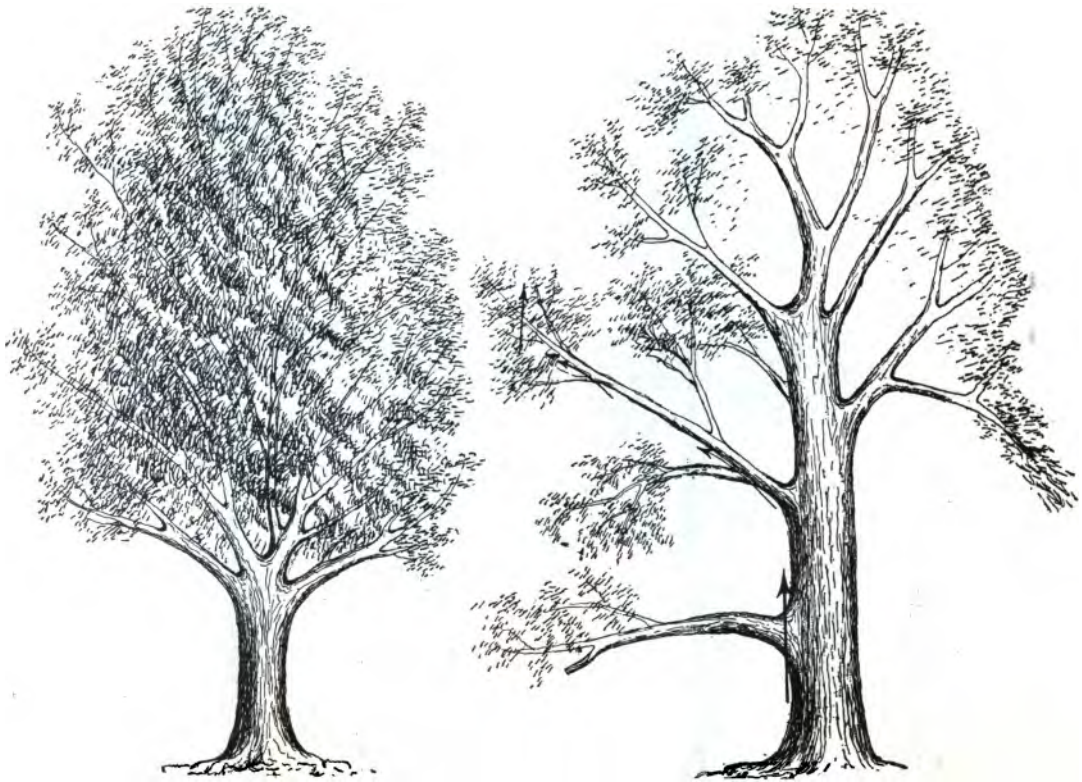
Effect of crowding.
Not worth saving.



Conifer.
Symmetrical.

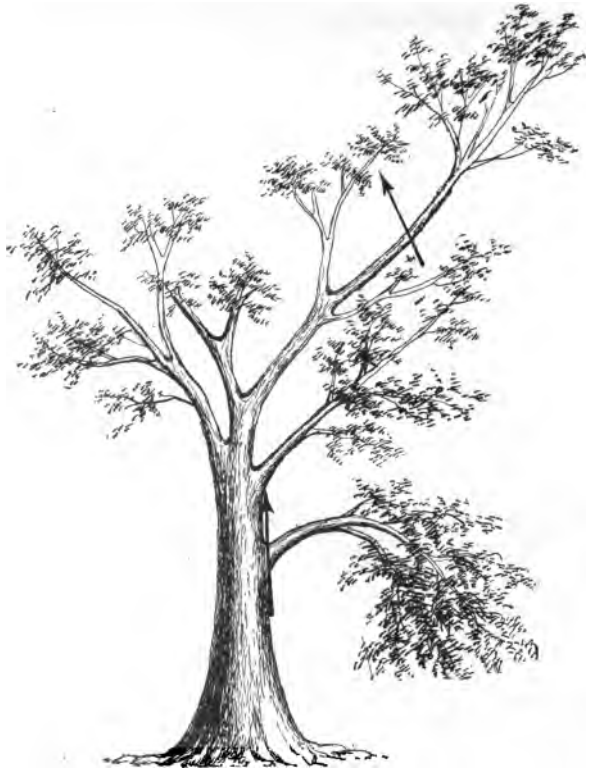


Conifer,
Unsymmetrical. Needed earlier pruning.



Symmetrical.

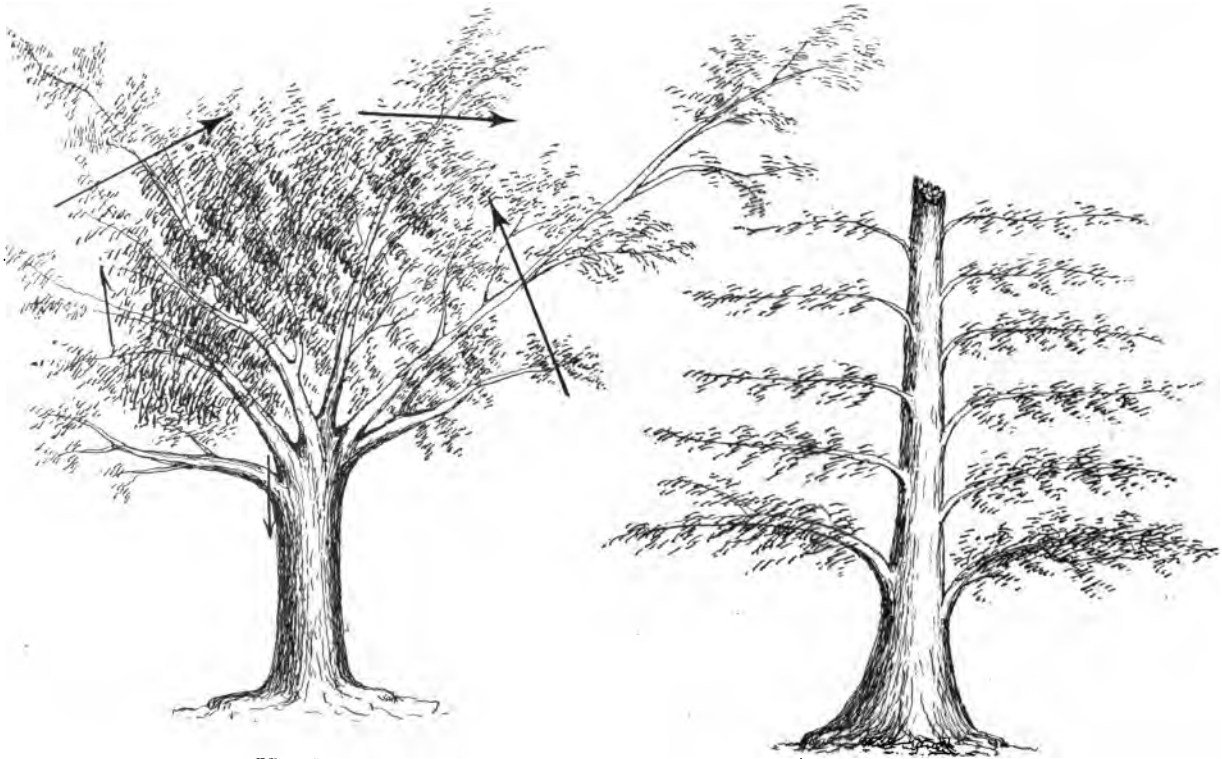
Unsymmetrical.
Long Neglected.



Unsymmetrical.
Much neglected.
Needed earlier pruning.

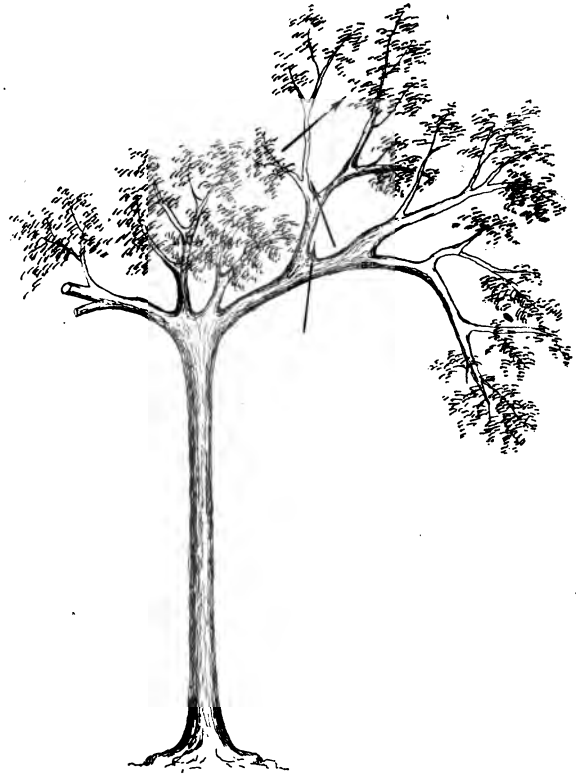
Conifer.

Conifer.
Effect of crowding.
May possibly recover.

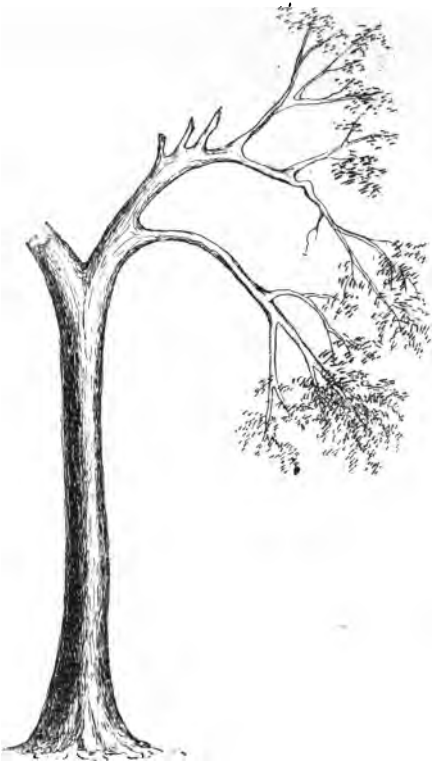


Neglected.
Needs pruning.

Conifer.
Not worth saving.



Very Unsymmetrical.
Long neglected.



Past Redemption.

3 2044 102 816 105